WATERBURY MUNICIPAL OFFICE

WATERBURY, VERMONT 05676

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November 30, 1999

Waterbury

Mr. George Desch Agency of Natural Resources Waste Management Division 103 S. Main St. Waterbury, VT 05671

Dear Mr. Desch:

The Village of Waterbury owns a 40+- acre parcel at the south-east corner of Waterbury adjacent to the Winooski River. Recently there has been talk of developing the site to include a possible ice rink and other recreational facilities. Since the site had once been used as a dump the Village hired Heindel and Noyes to investigate the site for potential contamination.

Contaminants have been identified there and we contracted for addition work by Heindel and Noyes. Their report and recommendations have been delivered to me. I have forwarded a copy to you for your use.

Please call me if you have questions. Certainly you should also feel free to call Jeff Noyes at Heindel and Noyes for further information.

Sincerely,

William A. Shepeluk Town/Village Manager

WAS/ntm cc: J. Noyes



Heindel and Noyes
P.O. Box 64709 Burlington, Vermont 05406-4709

Consulting Hydrogeologists

• Engineers

• Environmental Scientists

802-658-0820 Fax 802-860-1014

VILLAGE OF WATERBURY FORMER DUMP INVESTIGATION



Prepared by:

Heindel and Noyes

Prepared for:

Village of Waterbury Mr. William Shepeluk



November 15, 1999

Consulting Hydrogeologists

• Engineers

Environmental Scientists

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VILLAGE OF WATERBURY

FORMER DUMP INVESTIGATION

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Engineers

Environmental Scientists



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VILLAGE OF WATERBURY

FORMER DUMP INVESTIGATION

1.0 HISTORICAL PERSPECTIVE

The Village of Waterbury owns a closed municipal dump off Route 100 in Waterbury, Vermont. The location of the site is shown in the attachment on an orthophoto and USGS sheet (Attachment 1, pages 1-2).

During the construction of Interstate 89, gravel from the dumpsite was transported eastward to provide fill material for the Interstate highway construction. The excavation was subsequently filled with a variety of waste material(s). Periodic burning of the combustible materials occurred. Dump burning was standard operating procedure for municipalities in the early 1960's, prior to the advent of Vermont's modern day Solid Waste Regulations.

The Village is contemplating the development of this area which will facilitate public access and public use. As plans for the use of this area developed, information related to the dumping of industrial chemicals at the site also surfaced. Prior to investing in the planning and design process, the Village wanted to determine if these allegations were true. Notably, there was anecdotal evidence that chlorinated hydrocarbons (PCE, TCE) may have been deposited at the site. This investigation was designed to determine the presence or absence of chlorinated hydrocarbons as well as the lateral and vertical extent of these chemicals outside the suspected source area. The following sections of this report review the evidence and technical data collected to date.

2.0 PHYSICAL SETTING

The surficial geologic map for the site shows that the area has been dominated by alluvial/fluvial processes (Appendix 1, pages 4-5). Relief on the site is approximately 10 to 15 feet above average River stage, much of which is now defined by fill materials.

Below the alluvial material, we hypothesized either glacial till or lake clays given the glacial history of the Winooski River area. Surficial geologic mapping also showed evidence of bedrock outcrops which were confirmed west and north of the site.

2.1 Surficial Reconnaissance

Surficial reconnaissance of the area was undertaken to identify ground conditions as well as any surface manifestation of contaminants. During the reconnaissance, we planned the boring program and collected surface water samples and ground water samples from seepage points.

The reconnaissance identified a broad front of iron stained sediment extending from approximately S-1 to S-6, along the northern border of the Winooski River (Appendix 1, page 3). The iron staining observed along the river bank is a manifestation of the plume from the former dumpsite. Relict dump plumes develop when biodegradable or putrescible materials buried at or below the water table reduce dissolved oxygen concentrations. The development of anoxic conditions liberate iron, manganese, and other metal surface coatings on the aquifer skeleton. Iron and manganese are subsequently deposited in the discharge zone of the plume when this anoxic material comes in contact with the oxygen rich surface water environment. For preliminary investigations, this feature provides a good first approximation for the limits of contamination.

During the surficial reconnaissance and subsequent test program (August 10 and September 6, 1999), flow in the Winooski River was very low. The area of river adjoining the dumpsite features a ripple sequence, allowing us to wade the entire width of the stream. During the reconnaissance of the river bottom, we identified a number of leachate vent points which emerge in discrete, irregularly shaped red stained zones.

3.0 RESULTS OF PHASE I ASSESSMENT

With the completion of the surficial reconnaissance, we accessed the site and installed a series of borings, listed as SS-1 through SS-3. These are shown on the attached orthophoto. To minimize soil cuttings, these borings were advanced by hand auger techniques. Soil was screened visually and with a photoionization detector (PID). At no location did we find elevated PID readings or gross manifestations of contaminant.

A discrete interval ground water sampler was advanced at the locations shown on SP-1 through SP-4 on the enclosed orthophoto. Attempts to remove water from the refuse area were unsuccessful due to the low ground water conditions at the time. Advancement of the SS series soil borings to water table was precluded due to a bony, gravel interbed encountered at approximately 7 feet below grade.

SAMPED SAMPED IN DISPOSAL ANZA

A number of water samples were obtained from the Winooski River during the initial phase of the investigation. These sampling locations are described as S-1 through S-6 and are shown on the enclosed orthophoto. These samples were obtained by advancing a perforated pipe approximately 1 foot below the riverbed and pumping a small volume of water into a sample jar. The test results are tabulated on pages 1-3 of Appendix 2. Review of the data indicates the presence of PCE and its daughter products at all locations with the exception of S-2. Contaminant concentrations range from 1-53 ppb. PCE and trichloroethylene (TCE) were quantified above the drinking water standard in samples S-3, S-4, S-5, and S-6.

Also during the first phase of the investigation, a piezometer pair was "hand advanced" at location S-7S and S-7B. The purpose of the piezometer pair was to determine if there was increasing concentrations of solvents with depth in ground water. This pattern of increasing concentration with depth is often linked to free product (DNAPL) in the source zone. As the test data shows, 7-S, 7-D displayed the characteristic of increasing concentration with depth. Total chlorinated hydrocarbons varied from approximately 275 in the upper piezometer to 425 parts per billion in the lower piezometer.

As was mentioned above, several oblong shaped iron stained areas were noted within the stream itself. Two locations identified as "River Seeps" in the attached orthophoto were sampled on August 12, 1999. Data indicates total chlorinated compound

concentrations of between nondetect and 4.9 ppb. We believe these iron stained areas represent areas of upwelling of contaminated ground water in the river water column.

Following the reconnaissance level survey and sampling operation, we reported the results to the Village with a recommendation that additional testing onsite occur. This testing was designed to sample the entire vertical interval of the aquifer from the ground surface to refusal (bedrock, till, clay) to determine if there were significant increases or decreases in the contaminant distribution with depth. This was also designed to further evaluate potential risk to public health (nearby water systems) or the environment (Winooski River) (Appendix 2, pages 1-22).

4.0 SUBSEQUENT INVESTIGATION

On September 6-8, 1999, additional information on the subject area was gathered. This included the installation of tiered monitoring wells (MW-1, 2, and 3) as well as the placement of additional piezometric devices in the riverbed (RPZ-2 through 4).

Soil borings at MW-1, 2 and 3 were advanced by first excavating a test pit in the area to remove the nested boulders encountered during hand augering. A hollow stem auger drill rig was then utilized to advance the monitoring well cluster borings to a total depth of approximately 30 feet.

A pair of monitoring wells was installed in each location to assist in delineating the vertical extent of soil and ground water contamination. A photoionization detector was utilized to screen the soils removed during the test pit and boring operations.

At all locations coarse sandy and gravely sediments were identified to depth. Soil boring and monitoring well installation logs are included in Appendix 3. No elevated PID readings were recorded during any of the excavation and boring events.

A discrete interval ground water sampling device was utilized to sample ground water to a maximum depth of 51 feet at the MW-2B location. Probe advancement and ground water recovery from the device indicate that sandy gravels are present to depth. Refusal at 51 feet is likely on bedrock.



Four river piezometer pairs were installed to better quantify the flux of ground water and contaminants into the river bottom. One of the piezometer clusters was destroyed during recent flooding. The remaining points are labeled RPZ-2 through 4 on the orthophoto (see attachment). The "shallow" point was advanced to approximately 1.5 feet below the river bottom. The "deep" point was advanced to 3.5 feet below the river bottom. Each point consists of a 3/4 inch diameter metal pipe open at the bottom of the monitoring device. After installation of the all the monitoring devices, a complete site survey was performed with a laser transit to locate and determine the relative elevations of all the monitoring wells and river sampling points. (Appendix 3, pages 1-6.)

4.1 Soil and Water Quality Test Results

Soils Test Data

At monitoring wells 1, 2 and 3, chlorinated hydrocarbons were identified in all soil samples recovered. Test data indicates that soil samples contained from 3 to 15 (\pm) parts per billion of chlorinated hydrocarbons attached to the aquifer skeleton. There was no evidence of DNAPL or residual phase contaminant in this suite of samples. Soil test data are tabulated in Appendix 4, along with the laboratory reports. (Appendix 4, pages 1-7.)

Discrete Interval Ground Water Data

At monitoring well 2-B, discrete interval ground water samples were taken from 18 to 51 feet. A total of 6 intervals were sampled. The discrete interval sampling is summarized in Appendix 5. Laboratory information follows. (Appendix 5, pages 1-7.)

The discrete interval samples show a general increase in depth of total chlorinated compounds from approximately 50 parts per billion at 18 feet to 115 parts per billion at 48 feet. There is a slight <u>decrease</u> in total chlorinated hydrocarbons at 51 feet where approximately 85 parts per million were measured.

Ground Water and Surface Water

Following the development of the monitoring wells, and an equilibration time approximately 10 days, ground water and surface water samples were obtained. Each of the monitoring wells and river piezometer points were sampled on September 21st.

Additionally, river water samples were also obtained adjacent to the RPZ and S-7 locations. on the September 21st sampling data, the effects of chlorinated hydrocarbons in the river water were masked by the substantial storm event occurring several days prior to the sampling.

Each of the monitoring wells and RPZ points were sampled utilizing a low flow purging technique. Tubing was lowered into each sampling point to the screened interval level (see soil boring and well construction logs in Appendix 3). Ground or surface water was purged from the points at a flow rate of less than 1/4 liter/minute through a "flow through" cell. A sample was obtained utilizing a bailer from the actively screened portion of each monitoring point once the temperature, pH, and dissolved oxygen concentrations in the cell had equilibrated. This ensured that accurate sampling of ground water was occurring from all points. All water quality data collected is tabulated in Appendix 2 with laboratory results following it.

The monitoring wells revealed contaminant concentrations in the 10 part per billion to 100 part per billion range. Significant changes in ground water chemistry were observed at monitoring wells 7-S and 7-D where substantial reductions in contaminant concentrations were measured. The highest concentration of ground water contamination was found in monitoring well 2-B where total chlorinated hydrocarbons were approximately 125 parts per billion. Several unidentified peaks were also found.

The speciation of the chlorinated hydrocarbon indicates that biotic or abiotic breakdown of the contaminants is occurring. Since this plume is most likely in anoxic, the requisite first step for chlorine reduction is present. Degradation beyond cis-1,2-DCE was not identified.

As stated above, river samples were also acquired. Surface samples were taken adjacent to RPZ-2, S-7, RPZ-3, and RPZ-4. For the September 21st date, nothing was detected in the river water column, as samples were collected after a significant storm event.

4.2 Hydrogeology

Following the installation and development of all wells on the site, a survey of all monitoring wells and test location was accomplished. Tabulation of the monitoring

location, top of pipe location, and depth to the water table for the 9/21/99 sampling date is included in Appendix 6, page 1.

An examination of these data show that the water level in the plume area is virtually flat. Water surface elevation in ground water, for both piezometric and monitoring well devices, vary from 88.94 feet to 89.77 feet. Because the permeability of the gravel sediments is very high, the water table is relatively flat as little gradient is required to transmit flow.

We also expect that there is a strong hydrologic communication between the river and the adjoining alluvial aquifer. During major changes in the river stage, there will be substantial fluctuations in the water levels in the wells and the direction of ground water flow. This may explain the substantial reduction in chlorinated concentration in the piezometric devices (7-S, 7-D) between the two sampling dates. (Low river stage versus high river stage.) For dissolved phase contaminants which do not have a local source area (residual phase), this types of concentration variation would be expected as river water floods the shallow aquifer.

4.3 Conceptual Model of Contaminant Source and Distribution

The preliminary investigation has identified a low concentration plume with a well developed vertical and lateral extent. At virtually all locations within the boundary of the plume (generally defined by iron oxidation zone) chlorinated hydrocarbons can be found in concentrations of 10 to 400 parts per billion (±). Testing directly adjacent to the landfill did not reveal any significant PID readings at the individual soil boring locations. Testing of the soil in the transmission zone similarly did not reveal concentrations which would imply that the aquifer skeleton has a reservoir for DNAPL or residual phase chlorinated hydrocarbon.

In concert with the technical investigation, we have been evaluating the source of the contaminants disposed of in the dump. This evaluation is ongoing. At this time, we have two eye witnesses who explain that chlorinated hydrocarbons were brought to the site in a truck and spread across the surface of the landfill. To date, no one has described the placement of drums on the property.

EMPT/ Ru?

Our surficial reconnaissance did turn up the presence of five drums¹. We are currently preparing to manifest them off the site, the work is scheduled to be done by the end of November. Our best intelligence at this point suggests that these drums post date the placement of the chlorinated hydrocarbon by many years.

Eye witnesses explained that once the chlorinated hydrocarbons were spread across the surface, attempts were made to ignite them with fuel. While the chlorinated hydrocarbons will resist combustion, it's likely that the elevated ambient air temperatures did foster more rapid evaporation. Because this was largely an uncontrolled site, even the best eye witness account may not ever reveal the scope and extent of the dumping practice.

The significant vertical extent of the contaminant (51 feet below ground surface), as well as the tendency for some increased concentration with depth, does suggest vertical intrusion of DNAPL in the source area. All of the testing completed to date, however, does not suggest the presence of DNAPLs outside of the dump area proper.

5.0 RISK EVALUATION

The release at the Waterbury site constitutes a reportable event not only for the chlorinated hydrocarbons, but also for the aesthetics associated with the oxidation of dissolved iron and manganese plume at river's edge. Concentrations of these contaminants in the river water column may exceed Class B Water Quality Standards during low flow events. However, outside of relatively localized vent areas where ground water emerges in the river bottom, we do not expect significant violations of the Class B standards due to dilution with the Winooski River.

A bedrock/gravel interface was identified at approximately 51 feet below ground surface. To the south, there are community water systems drawing from the bedrock aquifer (Appendix 1, page 2 and 3). The wellhead protection area shown in the State's GIS database extends onto the site. Within the past 24 months we understand that these supplies have been attached to the village water system, therefore this risk has been eliminated. Since the new data eliminating the wellhead protection areas is not yet available on the web, we have taken the liberty to remove them pursuent to our conversation with the GIS Department in Water Supply. The proximity of the site to the

¹ See The Former Waterbury Dump - Waste Drum Disposal Report, H&N, November 5, 1999.

Puo Proport 7

Winooski River and the bedrock aquifer suggests additional work needs to be completed. This is described in the following section.

5.1 Additional Work

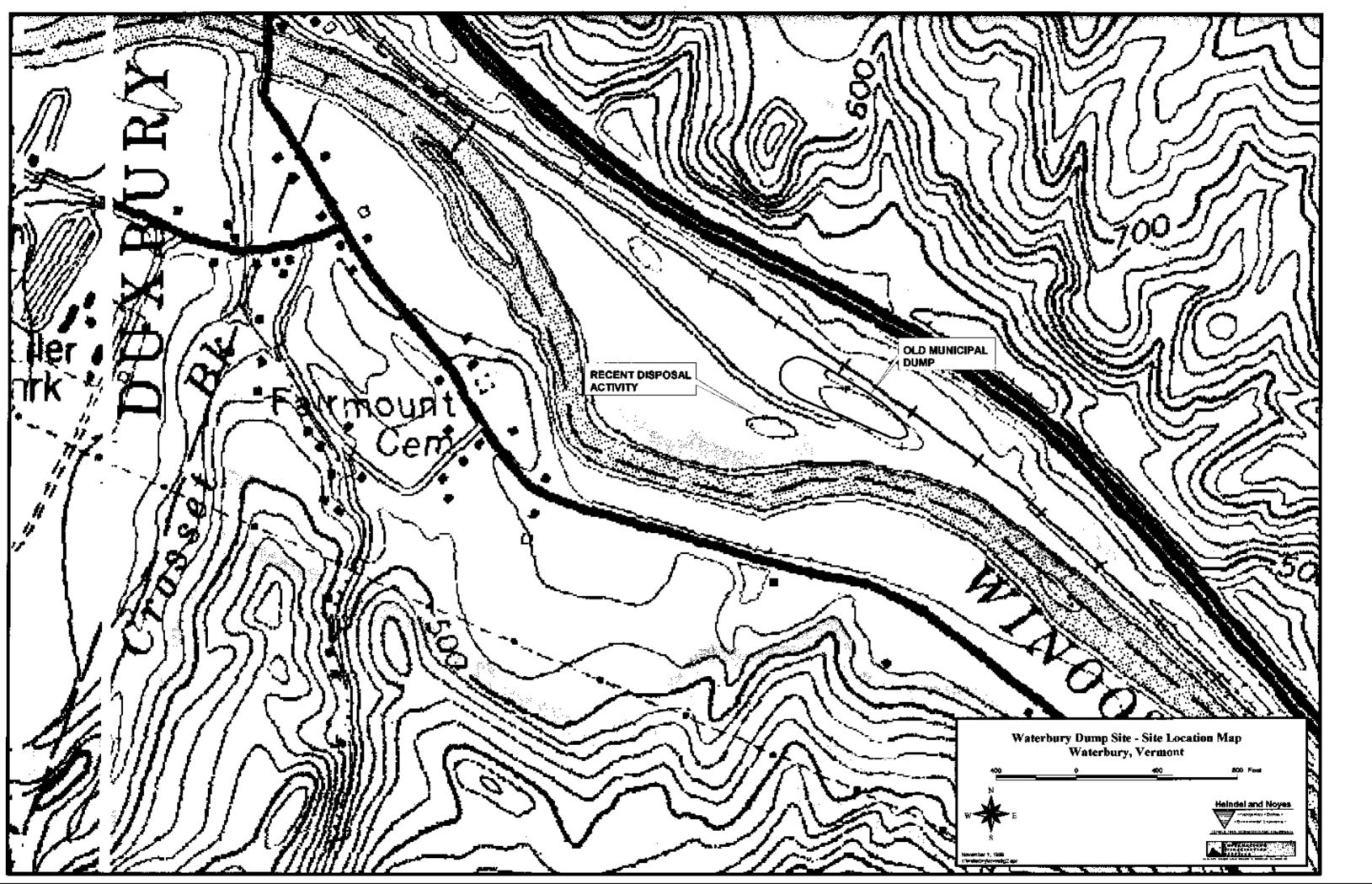
Research efforts providing the best understanding of how these source areas evolved are underway and should be completed by the end of November. While the threat of human consumption has been eliminated, the effect on the bedrock aquifer is unknown. The limits of the solid waste disposal facility, in total, need to be identified. The actual limits are not known, as certain portions of the property are now overgrown and have not been used for many years. These should be surveyed. If solvents were disposed of in areas which did not have putrescible material, the iron staining which defines the plume, would not be visible. Knowing the full extent of the source area is key in minimizing testing and investigation costs.

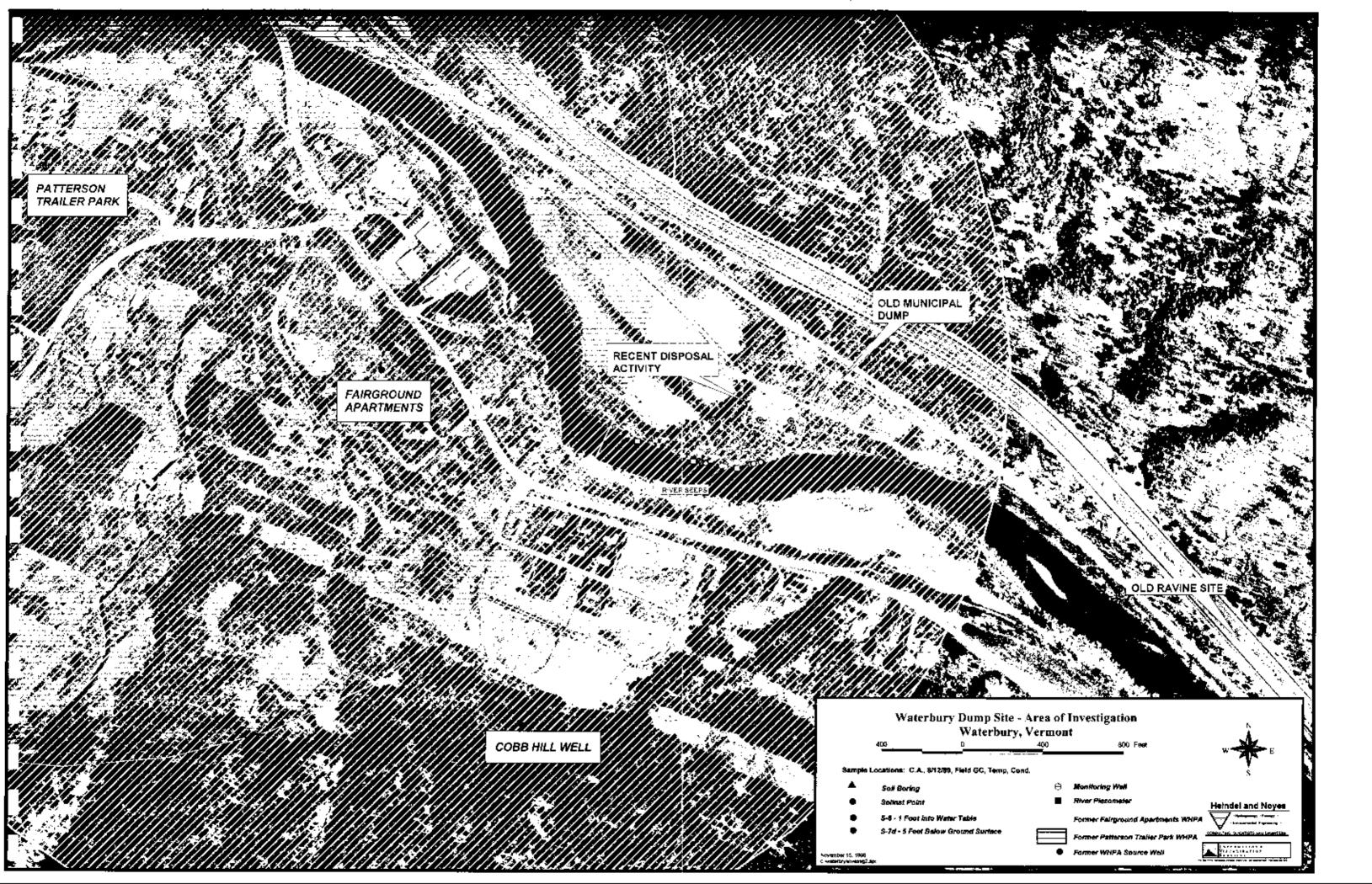
If eye witnesses can assist in determining where dumping zones occurred in the past, careful analysis and excavation with a backhoe would be recommended. This would allow for large scale viewing of soil and waste streams not possible with a drill.

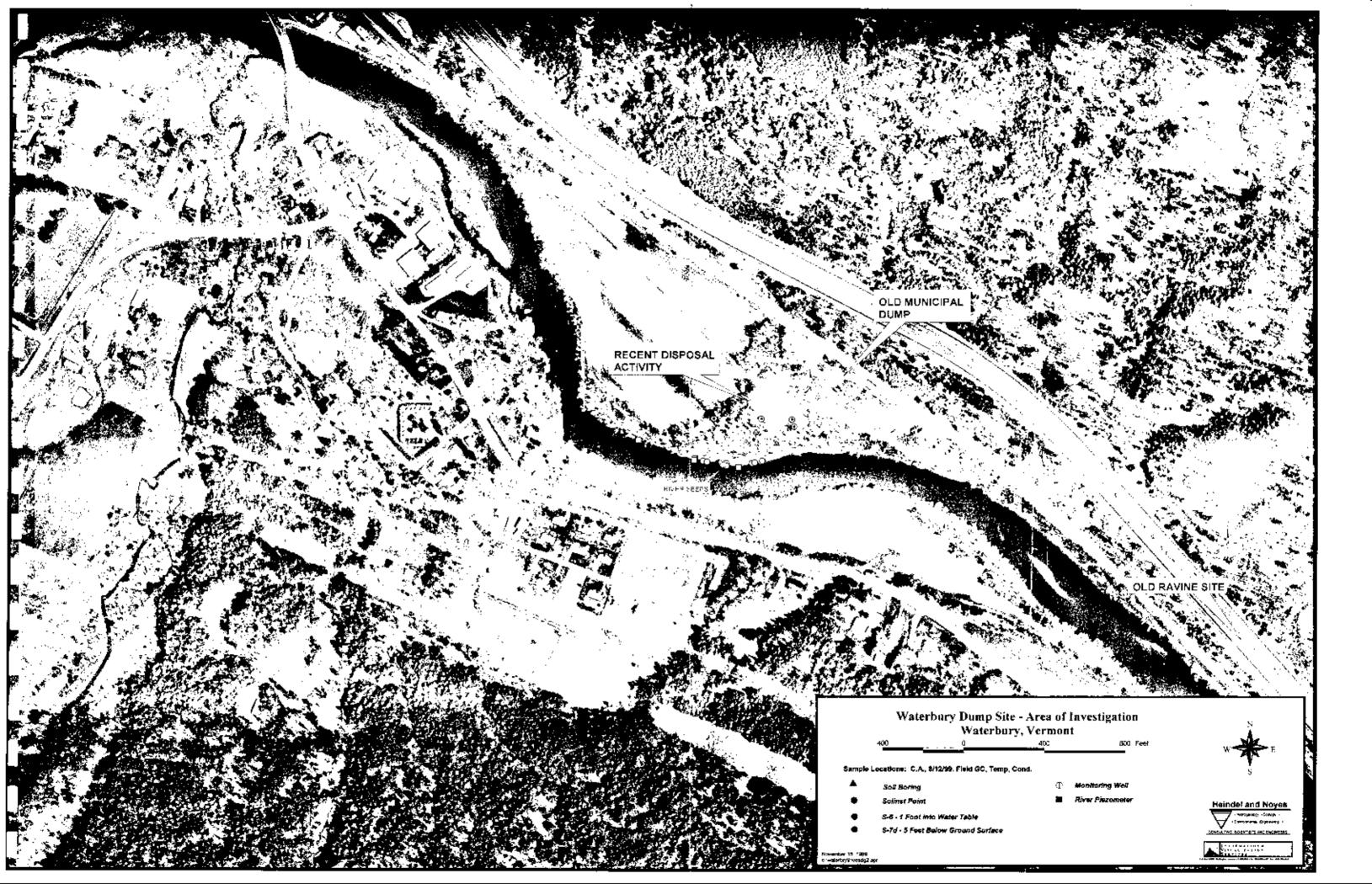
With a better understanding of the potential source area size and location, a limited number of discrete interval ground water sample points can be advanced in the areas most likely to contain DNAPLs (if present). Discrete interval ground water sampling to the bedrock interface will provide sufficient data to define whether DNAPLs do exist. The presence or absence of DNAPLs is essential to determine if a significant source for a health and environmental risk exists.

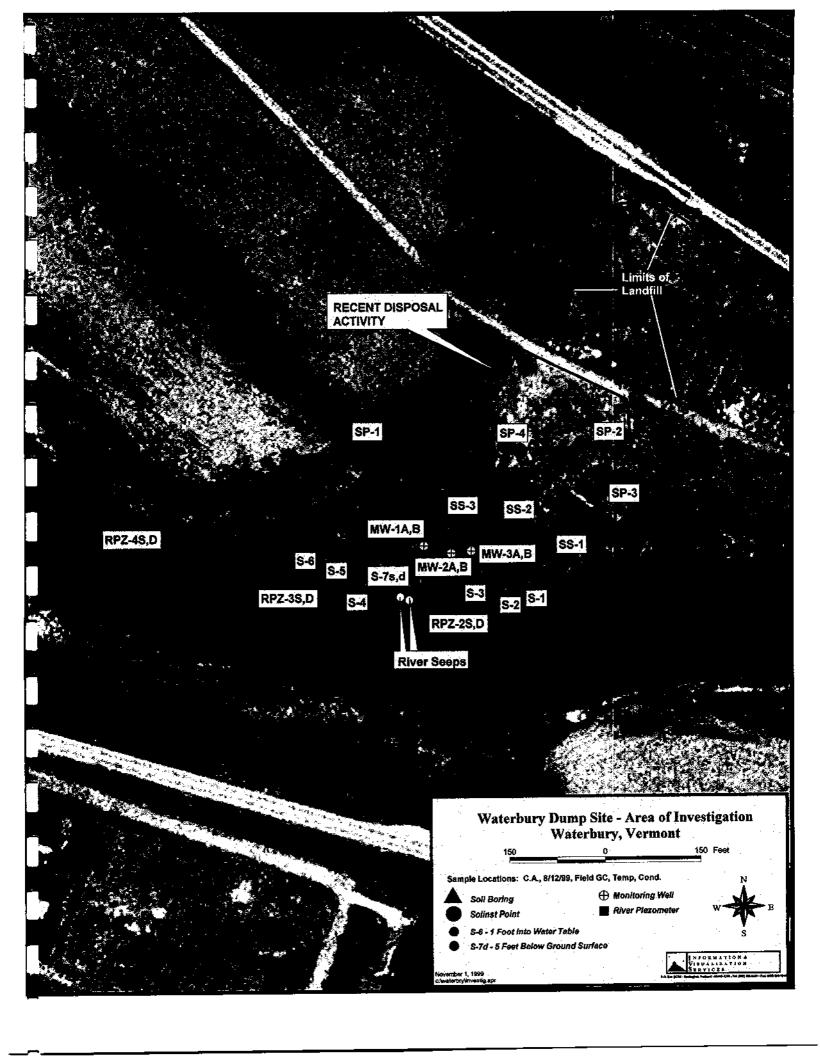
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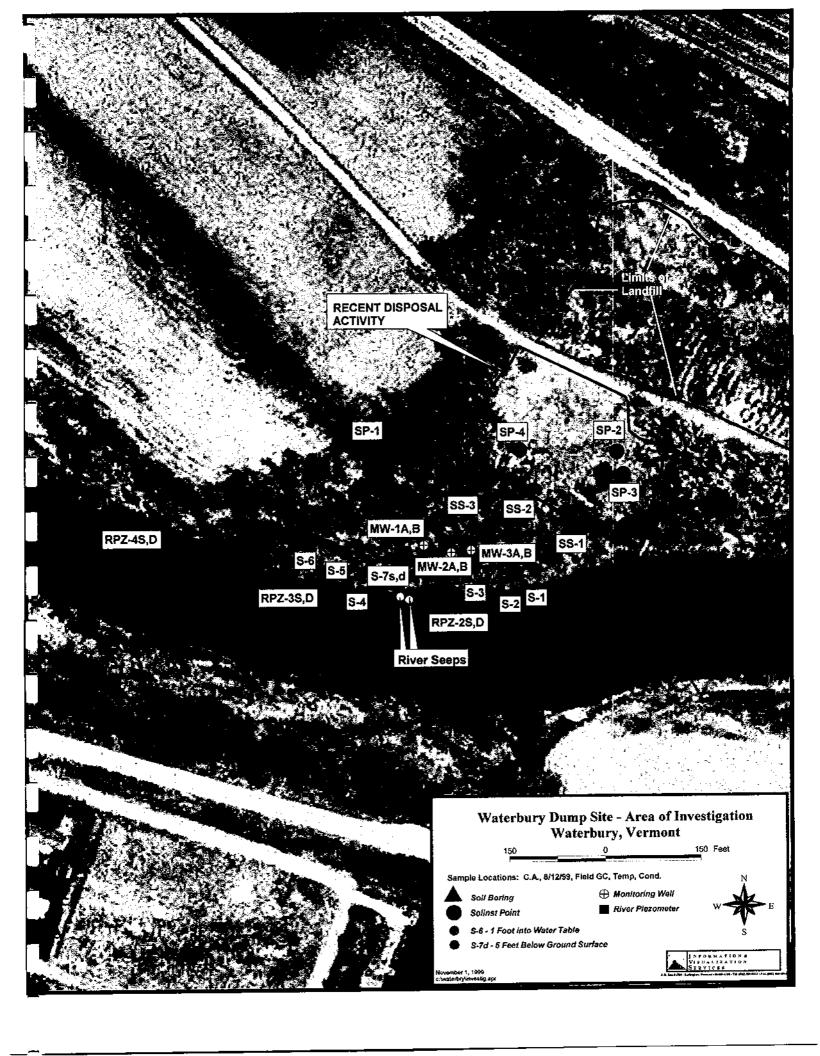
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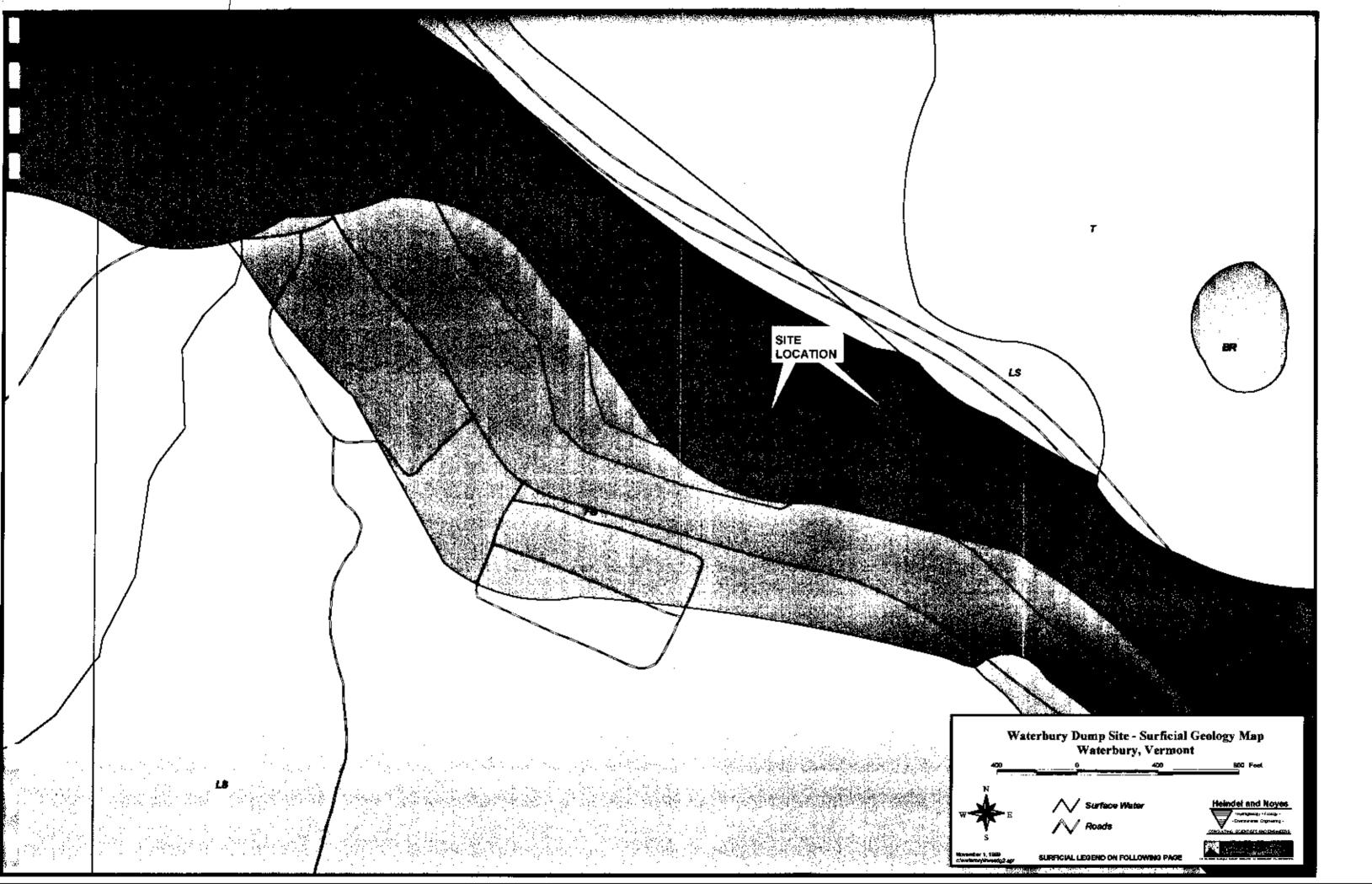












SURFICIAL GEOLOGY LEGEND

GLACIOLACUSTRINE



GLACIAL



Till mantling the bedrock and reflecting the topography of the underlying bedrock surface. Thicker in the valleys and thinner on the uplands. On many exposed uplands, postglacial erosion has left only rubble and scattered boulders on the



Ice marginal till accumulations with morainic topography. M- frontal moraine assumed to be recessional TM- terminal moraine.



KAME GRAVEL

ice contact outwash gravel. K- isolated kame.

KT- kame terrace



Horizontally bedded glaciofluvial gravel. Spillway or valley train gravel in stream valleys. May or may not have a thin veneer of postglacial alluvium.



A sinuous ridge of constructional form, consisting of stratified accumulations of glacial sand and gravel.

EOLIAN



EOLIAN SAND AND DUNES

Deposits of sand arranged by the wind.

LITTORAL SEDIMENT

PREDOMINANTLY GRAVEL

LG- horizontally bedded gravel deposited in a shoaling lake or topset beds of deltaic gravel where no foreset bedding is exposed.

BG- beach gravel.

DG- detta gravel showing foreset bedding.

D- small deltas composed of sand and gravel.

PS

CHAMPLAIN SEA

MARINE BEACH GRAVEL

MARINE SAND MS- marine sand without pebbles or boulders.

MARINE CLAY

GB

GRAVEL BAR

PLUVIAL

SWAMP, PEAT and/or MUCK

BEDROCK EXPOSURES

Locations with a solid filled bedrock symbol was

taken directly from the state source maps.

map bedrock symbols with a 25m buffer.

Locations with a hatch filled bedrock symbol represents generalized centerlines of state source

ЫR

A natural mound or exposed face of gravel.

PSM- pebbly marine sand.

PSM

LITTORAL SEDIMENT

PREDOMINANTLY SAND LS-well sorted sand, no pebbles or boulders

PS- pebbly sand.

BS- sand containing ice rafted boulders.

DS- detta sand.



LAKE BOTTOM SEDIMENTS

STC- silt, silty clay, and clay.

VC- varved clay.

BC- silt, silty clay, and/or clay containing ice rafted boulders.



WAVE-WASHED TILL

KM- kame moraine, kame complex with morainic topography Till from the top of which the finer materials have been removed by wave action, leaving boulder concentrations on the surface.



A linear accumulation of beach material, behind the beach which was created from waves or other action

POSTGLACIAL FLUVIAL



FLUVIAL GRAVEL

Gravel laid down by a river or a stream



FLUVIAL SAND Sand laid down by a river or a stream



RECENT ALLUVIUM

Accumulations of datrital materials, which have been eroded, transported, and deposited by streams.

SOURCE NOTES:

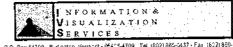
Surficial Geology was digitized and scanned by Wagner, Heindel, and Noyes, into a PC ARC/INFO database from 1:62500 original State of Vermont surficial geology base maps (1956-1966). These base maps were created under the supervision of David P, Stewart (1956-1966), Paul MacClintock (1963-1966), William F, Cannon (1964), G, Gordon Connally (1965), Parker E, Calkin (1965),

Robert E. Behting (1966), and William W. Shifts (1966). Surficial data for most of the state is available, in 15 minute quads, from IVS at WHN, Inc. (802) 658-0820. Generalized Bedrock Outcrops were digitized from 1:62500 state surficial geology maps as linear features, which were buffered to 25m. Data available from IVS at WHN, Inc. with surficial geology coverages. Road Centerlines were generated from pre-1990 1:5000 orthophotos (or better). Road data (RDSnn) is available from the Vermont Center for Geographic Information, VCGI (802) 656-4277.

Linear Surface Waters are Digital Line Graph Data, generated from 1:24,000 USGS topographic maps. This data is available from VGIS.

Town Boundaries were digitized from pre-1990 1:24000 USGS topographic maps. This coverage was created by the EPA and is available through VGIS.

Legend derived from 1:250,000 Surficial Geologic Map of Vermont (1970).



P.O. Box 84709 - Burlington, Vermont - 05408-4709 | Yel (802) 865-6437 - Fax (602) 860-1014

Former Waterbury Town Dump Field GC Results (ug/L)

Location	Compound	VGES	8/12/1999	9/21/1999
<u></u>	PCE	5	ND / < 1	
•	TCE	5	0.9	
	cis-1,2-DCE	70	14	
	# UIPs		0	
3-2	PCE	5	ND / < 1	
	TCE	5_	ND / < 1	
	cis-1,2-DCE	70	ND / < 10	
	# UIPs		0	
3-3	PCE	5	16	
	TCE	5	7.5	
	cis-1,2-DCE	70	53	
	# UIPs	-	2	
S-4	PCE	5	15	
•	TCE	5	8.3	
	cis-1,2-DCE	70	4.7	
•	# UIPs		0	
S-5	PCE	5	34	
•	TCE	5	16	
	cis-1,2-DCE	70	40	
	# UIPs		0	
S-6	PCE	5	12	
-	TCE	5	8.4	
	cis-1,2-DCE	70	2.7	
	# UIPs		0	<u></u>
S-7s	PCE	5	37	3.9
0.10	TCE	5	18	2.0
	cis-1,2-DCE	70	237	10
	# UIPs		2	1
S-7d	PCE	5	46	6.6
5-74 I	TCE	5	22	3.2
	cis-1,2-DCE	70	342	17
	# UIPs		2	2
MW-1A	PCE.	5		5.7
MINAMAIN	TCE	5	<u> </u>	3.5
	cis-1,2-DCE	70		28.0
	# UlPs			0
MW-1B	PCE	5		9.8
1,4144-10	TCE	5		5
1	cis-1,2-DCE	70		20
	# UIPs	 		0
MW-2A	PCE	5		3.9
1V1 V V - Z/A	TCE	5		2.0
	cis-1,2-DCE	70	 	11
1	# UIPs			0
14141.00		5		15.0
MW-2B	PCE	5		9.6
	TCE	70		103
	cis-1,2-DCE			2
<u></u>	# UIPs			

VGES = Vermont Groundwater Enforcement Standards, November 1997.

ND = None detected.

Note: Bold, shaded results exceed VGES.

Former Waterbury Town Dump Field GC Results (ug/L)

Localin:	Compound	VGES	8/12/1999	9/21/1999
IW-3A	PCE	5		2.0
	TCE	5		0.7
	cis-1,2-DCE	70		3.1
	#UIPs			0
NW-3B	PCE	5	1	6.1
	TCE	5		3.2
	cis-1,2-DCE	70		39
	#UIPs		 	1
PZ-1 \$	PCE	5		
	TCE	5	<u> </u>	
	cis-1,2-DCE	70	<u> </u>	
	#UIPs		+	
PZ-10	PCE	5	†	
. L 14	TCE	5	 	
	cis-1,2-DCE	70		
	#UIPs		 	
PZ-25	PCE	5		4.2
	TCE	5	 	2.8
	cis-1,2-DCE	70	†	6.3
	#UIPs		 	0.5
PZ-28	PCE	5		4.4
\	TCE	5		3.0
	Z	70		5
	cis-1,2-DCE			2
PZ-35			 	
(PZ- 34)	PCE	5 5		1,4
	TCE.		. -	0.7 2
	cis-1,2-DCE #UIPs	70		0
PZ-38		5	- 	1.5
(PZ-38)	PCE	5		
	TCE	ļ <u>-</u>		1.3
	cis-1,2-DCE	70	•	3.9
D7 #=	#UIPs		<u>.</u>	0
RPZ-45	PCE	5	ļ. .	
	TCE	5		
	cis-1,2-DCE	70	<u></u>	
\D-7 E	#UIPs			
RPZ-	PCE	5	1	ND / < 1
	TCE	5		ND / < 1
	as-1,2-DCE	70		ND / < 10
	#U!Ps			0
River Stage		5	ND / < 1	
	TCE	5	ND / < 1	
	cis-1,2-DCE	70	ND / < 10	
	#UIPs		0	
River 2 2	PCE	5	ND / < 1	
	TCE	5	ND / < 1	
	cis-1,2-DCE	70	4.9	
	#UIPs	· · · · · · · · · · · · · · · · · · ·	0	1

yz Met

20 201

VGES = Vermont Groundwater Standards, November 1997.

ND = None detected.

Note: Bold, shaded results exp. 12-53:

Former Waterbury Town Dump Field GC Results (ug/L)

Location	Compound	VGES	8/12/1999	9/21/1999
River at RPZ-2		5		ND / < 1
	TCE	5		ND / < 1
	cis-1,2-DCE	70		ND / < 10
•	#UIPs			0
River at S-7	PCE	5		ND/<1
	TCE	5		ND / < 1
	cis-1,2-DCE	70		ND / < 10
	# UIPs			0
River at RPZ-3	PCE	5		ND / < 1
	TCE	5		ND / < 1
	cis-1,2-DCE	70		ND/<10
	# UIPs			0
River at RPZ-4	PCE	5		ND / < 1
	TCE	5		ND / < 1
	cis-1,2-DCE	70		ND / < 10
	# UIPs			0



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-1A

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

Parameter	Water Detection Limit (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		28
Benzene	1 '	i	ND
Trichloroethene	1	İ	3.5
Toluene	· 1	:	ND
Tetrachloroethene	1		5.7
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected u:PROJECTS/WATER_DUMP/NEAQTFGCWATER921.doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

— CLIENT:

PROJECT NAME: Waterbury Dump

_ DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-1B

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

-	<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)	<u>Result</u> (μg/L)
	MTBE	20	ND ¹
-	cis-1,2,-Dichloroethene	10	20
-	Benzene	1 .	ND
	Trichloroethene	1	5.0
-	Toluene	1	ND
_	Tetrachloroethene	. 1	9.8
	Ethyl benzene	1	ND
-	Xylenes	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

U:\PROJECTS\WATER_DUMP\NEAQTFGCWATER921.doo

¹None detected

- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- · Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-2A

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (μg/L)		Result (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10	:	11
Benzene	1	i	ND
Trichloroethene	1 .	 	2.0
Toluene	1		ND
Tetrachloroethene	1		3,9
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS:WATER_DUMP:NEAQTFGCWATER921.doc



- · Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- · Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT:

PROJECT NAME: Waterbury Dump

_ DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-2B

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Par</u>	rameter	<u>Water Detection Limit</u> (μg/L)	<u>Result</u> (μg/L)
МТ	BE	20	ND ¹
cis-	-1,2,-Dichloroethene	10	103
Bei	nzene	1	ND
Tric	chloroethene	1	9.6
Tol	uene	1	ND
Tef	trachloroethene	1	15
Eth	nyl benzene	1	ND
Xy:	lenes	2	ND

¹None detected U:PROJECTS:WATER_DUMP:NEAQTFGCWATER921.doo

- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-3A

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		3.1
Benzene	1	i	ND
Trichloroethene	1	İ	0.7
Toluene	. 1	·	ND
Tetrachloroethene	1		2.0
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS/WATER_DUMP/NEAQTFGCWATER921,doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT:

PROJECT NAME: Waterbury Dump

- DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-3B

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		39
Benzene	1	;	ND
Trichloroethene	1		3.2
Toluene	· 1		ND
Tetrachloroethene	1		6.1
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS:WATER_DUMP:NEAQTFGCWATER921.doc

- Source Emissions Testing
- Source Permitting
- · Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: S-7S

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (μg/L)		<u>Result</u> (μg/L)
МТВЕ	20		ND ¹
cis-1,2,-Dichloroethene	10		9.9
Benzene	1	į	ND
Trichloroethene	1	<u> </u>	2.0
Toluene	1		ND
Tetrachloroethene	1		3.9
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS\WATER_DUMP\NEAQTFGCWATER921,doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: S-7D

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

_	Parameter	<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
	MTBE	20		ND ¹
_	cis-1,2,-Dichloroethene	10		17
-	Benzene	1		ND
	Trichloroethene	1	: : :	3.2
-	Toluene	1		ND
_	Tetrachloroethene	1		6.6
	Ethyl benzene	1		ND
_	Xylenes	2		ND

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- · Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: River by S-7

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10	·	ND
Benzene	1	·	ND
Trichloroethene	1	<u> </u>	ND
Toluene	× 1	·	ND
Tetrachloroethene	1		ND
Ethyl benzene	· 1		ND
Xylenes	2		ND

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

_ CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: River by RPZ-3

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
20		ND ¹
10		ND
1	:	ND
1		ND
、1		ND
1		ND
1		ND
2		ДN
	(μg/L) 20 10 1 1 1 1 1	(μg/L) 20 10 1 1 1 1 1

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-2D

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
мтве	20		ND ¹
cis-1,2,-Dichloroethene	10		5.0
Benzene	1		ND
Trichloroethene	1 .		3.0
Toluene	. 1	•	ND
Tetrachloroethene	1		4.4
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected u:\projects\water_dump\neaqtfgcwater921.doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-2

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (µg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		ND
Benzene	1	: :	ND
Trichloroethene	1		ND
Toluene	1		ND
Tetrachloroethene	1		ND
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS:WATER_DUMPWEAQTFGCWATER921.doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- · Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-2S

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (µg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		6.3
Benzene	1	j ł	ND
Trichloroethene	1	; ;	2.8
Toluene	1		ND
Tetrachloroethene	1		4.2
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected U:PROJECTS:WATER_DUMP:NEAQTFGCWATER921.doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT:

PROJECT NAME: Waterbury Dump

— DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-3S

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		2.0
Benzene	1		ND
Trichloroethene	1	:	0.7
Toluene	. 1		ND
Tetrachloroethene	1		1.4
Ethyl benzene	1		ND
Xylenes	2		ND

¹None detected u:projects/water_dump/neaqtfgcwater921.doc

- Source Emissions Testing
- Source Permitting
- · Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-3D

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		3.9
Benzene	1		ND
Trichloroethene	1	ŕ	1.3
Toluene	1		ND
Tetrachloroethene	1		1.5
Ethyl benzene	1		ND
Xylenes	2		NĎ

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected U:PROJECTS:WATER_DUMP/NEAQTFGCWATER921.doc



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT:

PROJECT NAME: Waterbury Dump

_ DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: River by RPZ-4

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	<u>Water Detection Limit</u> (μg/L)	<u>Result</u> (μg/L)
MTBE	20	ND ¹
cis-1,2,-Dichloroethene	10	ND
Benzene	1	ND
Trichloroethene	1	ND
Toluene	. 1	ND
Tetrachloroethene	1	ND
Ethyl benzene	1	ND
Xylenes	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT:

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/21/99

ANALYSIS DATE: 9/21/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: RPZ-4D

SAMPLER: Steven LaRosa

ANALYZED BY: Jon P. Wilkinson

<u>Parameter</u>	Water Detection Limit (μg/L)		<u>Result</u> (μg/L)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		ND
Benzene	1	;	ND
Trichloroethene	1		ND
Toluene	1		ND
Tetrachloroethene	1		ND
Ethyl benzene	1		ND
Xylenes	2		ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected U:PROJECTS/WATER_DUMP/NEAQTFGCWATER921.doc

NEW ENGLAND AIR QUALITY TESTING

- Source Emissions Testing
- Source Permitting
- · Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CHAIN-OF-CUSTODY RECORD

PAGE / OF 2

99109 TZ Project Name: Waterbury Dump Collected By: Steve La Roga Project Number:____

Sample Location	Matrix	Date and Time	Containers	Analysis	Sample Preservation None	
mW-1A	4,0	9/21/29 1050	1-40ml VOA	VOC Screen		
MW-1B		1105				
mw-74		0511				
mw-ZB		1127				
mw-34		1140				
5-75		145				
5-7D		147				
River by S-7		143				
River by RPZ-3		136	(1/			
12PZ-2D		150				



- · Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- · Indoor Air Sampling and Analysis
- · Consulting/Engineering Services

CHAIN-OF-CUSTODY RECORD

PAGE ZOFZ

Project Name: Waterbury Dump Project Number: 99109 TZ

Collected By: Steve La Rosa

Sample Location	Matrix	Date and Time	Containers	Analysis	Sample Preservation	
Z-298	420	9/21/99 1223	1- YONI VOA	VOA-Schern	None	
RPZ -25	1	. 152	,	,	1	
RPZ-35		140			-	
RPZ-3D		138				
River by RPZ-Y		215				
RPZ-4D	V	(y 213		V	ψ_{ι}	
MW 3B	V	1150	7	V	V	
_						

Relinguished By (Signature)	Date/Time	Print Name	?
The	9/2/181	1/ over hat	1050
	/ /	,	
10% 1. \	9/2/199/1545	Jan Wilkin	(cm
	1 / 1		

9	4 ,	TY NO B STUGATE	ON_	P.O. Box 64709, Burlington, Verm 05406-4709 Tel: 802-658-0820 Fax: 802-860-1014	:	Project Name: Waterbury Dump Project Location: Waterbury, Vermont Boring Number: 1 Sheet 1 of 1 SDI Project Number: 99930				
——— Boring L	ocation: MW	-1B		Date Started: 9/8/99			er Start: 661.2	•		
orema I&N St	n: Chris Aldric aff: Chris Aldı	ch rich and St	even LaRo	sa Date Completed: 9/8/99	 т	Rig Hours Met	er End: 663.0	Time: 10:05 AM		
Split Size:	ng Method: Spoon er:		Direct Pu Size:	sh Other		Other Date		Casing Stabil.		
Fall:		npte		Sample Description		Strata Change & General Description	Equipment or Well Installed			
No.	Recovery	Depth	Blows	Augured to 10'. Dry, fine and me	edium	NA ·	NA	Screen 2' .020 with sock.		
1	1'	10-12'	WOH.	sands. Silty fine sand, gray/orange gray		Saturated	Background	Native backfill,		
2	.5'	15-17	2,20,12 4,4,7,9	Coarse, sandy, medium gravel. Saturated 0.2			0,2	Bentonite chips 14' -		
3	1.2'	20-22'	6,14,16,	16, Light brown coarse sand and medium Saturated 0		0.2	Native fill to ground surface.			
4	7	25-27'	16 14,12, 12,10	gravel. As above.		Saturated	0.2	Stickup.		
				Set 2" diameter PVC well to 23'.						
		<u> </u>	<u> </u>							
		 	 							
					·	<u> </u>				
			ļ				 			
	<u> </u>	 	-							
		 								
Trace	ortions Used e: 0 to 10% : 10 to 20%	Penetr 140 lb. Cohes		0" on 2" O.D. Sampler Cohesive		Well Construct 2" PVC Screen		Sand:		
Som	e: 20 to 35% 35 to 50%	Densit 0-4	Y Very Lo Loose	3-4	Very Soft Soft	2" PVC Riser:		Concrete: 1 bag Bentonite chips: 1/2		
5-9 Loose 10-29 Med. I 30-49 Dense		9-15	M/Stiff Stiff Very Stiff	Plug/Cap: 2 c		Well Guard: 1 stick				

Very Stiff Hard

16-30

31+

WOH=WEIGHT OF HAMMER NA=NOT APPLICABLE

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50+

Very Dense

PECIALTY
THE LINES &
MVESTIGATION
分以為 [17][45][2][45][4][4][4

P.O. Box 64709, Burlington, Vermont

05406-4709

Tel: 802-658-0820 Fax: 802-860-1014 Project Name: Waterbury Dump Project Location: Waterbury, Vermont Boring Number: 2

Sheet 1 of 1 SDI Project Number: 99930

347		经等7系4				\						
Forem	Location: MW	ch	avan I aRo	-	Date Started: 9/8/99 Date Completed: 9/8/99			Rig Hours Meter Start: 663.0 Time: 10:05 AM Rig Hours Meter End: 663.8 Time: 10:50 AM				
Sampling Method: Split Spoon Size: Hammer:				ısh	sh Other			adings Dept		Stabil.		
Fall:					Sample escription		Strata Change & General Description	Field Testing PID		nt or Well alled		
No.	Recovery	Depth	Blows	Augured to 13'. S	et 2" diame	eter PVC well.			5' .020 scre sock 13' - 1	3'.		
				<u> </u>					Native fill 1 Bentonite			
						<u> </u>			Native fill to surface.	ground		
						·. ·			Stickup.			
							'	<u></u>				
	· · · · · · · · · · · · · · · · · · ·											
					•		i					
						· 						
			, , , , , , , , , , , , , , , , , , , 							<u> </u>		
	<u> </u>											
Proportions Used Trace: 0 to 10% Little: 10 to 20% Some: 20 to 35%		Penetrat 140 lb. w Cohesive Density		nce ' on 2" O.D. Sample	r <u>Cohesiv</u> Consiste		Well Construction 2" PVC Screen (Sand;			
	35 to 50%	0-4 5-9	Very Loos Loose Med Der		0-2 3-4 5-8	Very Soft Soft M/Stiff	2" PVC Riser: tw Plug/Cap: 1 eac		Concrete: 1 Bentonite ch	bag ips: 1/2 bag		
10-29 Med. Dens 30-49 Dense 50+ Very Dens				9-15 16-30 31+	Stiff Very Stiff Hard	Filter Sock: 6'	•	Well Guard:	•			

WOH=WEIGHT OF HAMMER

NA=NOT APPLICABLE

U:\PROJECTS\WATER_DUMP\SOILLOGS.DOC

-	9	PECIAL:			P.O. Box 64709, Burl 05406-4709 Tel: 802-658-0820 Fax: 802-860-1014	ington, Verm	nont	Project Name: Waterbury Dump Project Location: Waterbury, Vermont Boring Number: 3 Sheet 1 of 1 SDI Project Number: 99930		
 	C	Location: MW-	:h	Sarzan	Date Started: 9/8/99				Meter Start: 663.8 Meter End: 665.0	ì
-	H&N S	taff: Chris Aldr	ich and Ste	even LaRos	a Date Comple	ted: 310133		Groundwater	Readings	
_	Split Size:_ Hamm	ng Method: Spoon er:		Direct Pu Size:		Other		Date Time	Depth	Casing Salan.
_	=	San	ż			ample scription		Strata Change & General Description	Field Testing PID	Equipment or Well Installed
-	No.	Recovery	Depth	Blows			. 	<u> </u>		5' ,020 screen 13' - 8'.
			10.10	5,9,12,7	Augured to 10'. Coarse, sandy, me	dium gravel.		Saturated	Background	Native fill 13' - 7'
	1	1.0	10-12'	2,3,5,12	Fine gravel with sa			Saturated	Background	Bentonite chips 7' - 6'
	2	1.0						<u> </u>		Native fill to ground surface.
_		 	<u> </u>	<u> </u>	Set 2" diarneter PV	/C well to 13				Stickup.
_										
			 	<u></u>				+		
-				 						
		 -						<u> </u>		
_			<u> </u>	 				<u> </u>		
_	-	 	 	<u> </u>						
	-		 -	 						
<u> </u>					_					
_			Penet	ration Resis	stance			Well Cons	truction Details	
	Tra	portions Used ice: 0 to 10% le: 10 to 20%	140 lb Cohe	o, wt falling i sive	30" on 2" O.D. Sample	er <u>Cohesive</u> Consiste	E DCV		reen (.020); one 5'	Sand: Concrete: 1 bag
_	So	me: 20 to 35% d: 35 to 50%	0-4	<u>ity</u> Very L Loos e		0-2 3-4	Very Soft Soft	2" PVC Ri Plug/Cap:	ser: two 5'	Bentonite chips: 1/2 bag
_	5-9 Loos 10-29 Med. 30-49 Dens			Med. [Dense :	5-8 9-15 16-30 31+	M/Stiff Stiff Very Stiff Hard	Filter Soc		Well Guard: 1 stickup

WOH=WEIGHT OF HAMMER
NA=NOT APPLICABLE
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SPECIALTY
FILLIMG &
WINESTIGATION

P.O. Box 64709, Burlington, Vermont 05406-4709

Tel: 802-658-0820

Project Name: Waterbury Dump

Project Location: Waterbury, Vermont Boring Number: 4 Sheet 1 of 2

		SINGA II		Fax: 802-860-1014			SDI Project Num	ber: 99930	1 to 1 to 1 to 1 to 1 to 1 to 1 to 1 to		
	Location: MW an: Chris Aldri		r sampling)	Date Starte	d; 9/8/99		Rig Hours Meter Start: 665.0 Time: 12:30 PM				
H&N S	taff: Chris Aldı	rich and St	even LaRo	sa Date Comp	leted: 9/8/	99	Rig Hours Met	er End: 668.4	Time: 5:45 PM		
Sampling Method: Split Spoon Direct Pu Size: Size: Hammer:						Groundwater Readings Date Depth Casing Stabi Time					
Fall:			Sample Description		Strata Change & General Description	Field Testing PID	Equipment or Well Installed				
No.	Recovery	Depth	Blows	Augured to 15'.							
				Solenst tip samplin where refusal was collected.	g with dire encounter	ect push to 51' red. Samples	NA NA				
											
						<u>.</u>					
								<u></u>			
							;				
									1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	:					,- · ····					
					. <u></u> <u>.</u>						
Trace: 0 to 10%		Penetration Resistance 140 lb. wt falling 30" on 2" O.D. Sampler Cohesive Cohesive					Well Construction 2" PVC Screen		Sand:		
	20 to 35% to 50%	Density 0-4 5-9	Very Loo: Loose	se	Consiste 0-2 3-4	<u>ncy</u> Very Soft Soft	2" PVC Riser:		Concrete:		
		10-29 30-49 50+	Med, Den Dense		5-8 9-15 16-30	M/Stiff Stiff Very Stiff	Plug/Cap: Fitter Sock:		Bentonite chips: Well Guard:		
		50*	Very Den	oe	31+	Hard	FILE SUCA.		well Spare.		

-	SPECIALTY BALLING & MYESTIGATION			P.O. Box 64709, Burl 05406-4709 Tel: 802-658-0820 Fax: 802-860-1014	lington, Ver	mont	Project Name: Waterbury Dump Project Location: Waterbury, Vermont Boring Number: 4 Sheet 2 of 2 SDI Project Number: 99930			
	orema	Location: MW- in: Chris Aldric taff: Chris Aldri	h		Date Started: 9/8/99 Date Completed: 9/8/99			Rig Hours Meter Start: 674.0 Time: 3:00 PM Rig Hours Meter End: 684.0 Time: 5:00 PM		
_ S	Sampling Method:			Direct Pu	ısh	Other /pe:		Groundwater Rea Date Time	adings Depth	Casing Stabil.
-		Sam	ple			ample cription		Strata Change & General Description	Field Testing PID	Equipment or Well Installed
- [-	No.	Recovery	Depth	Blows	Augured to 30'.					2' .020 screen with sock.
-			_ 		Set 2" diameter PV	C well.				Bentonite chips 10'-9'
}				 		·-··				Native fill to ground surface.
- - 		 								
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ļ										
_ {				-						
-	 -									
_										
			<u> </u>	<u></u>				14/-11 O oin oi	ion Details	
_ _	Trac	e: 0 to 10% : 10 to 20%	Penetra 140 lb. v Cohesiy		<u>tance</u> 0" on 2" O.D. Sampler	Collegive		Well Construction Details 2" PVC Screen (.020): one 5' San		Sand:
_	Som	ie: 20 to 35%	Density 0-4	Very Lo	oose	Consister 0-2	<u>ncy</u> Very Soft Soft	2" PVC Riser:		Concrete: 1 bag
	5-9 Loose 10-29 Med. D 30-49 Dense		Loose Med. D Dense Very D		3-4 5-8 9-15 16-30	M/Stiff Stiff Very Stiff	Plug/Cap: 1 e	ach	Bentonite chips: 1/2 bag Well Guard: 1 stickup	
—			50+	very L		31+	Hard	<u> </u>	<u> </u>	

WOH=WEIGHT OF HAMMER NA=NOT APPLICABLE U:\PROJECTS\WATER_DUMP\SOILLOGS.DOC

SPECIALTY
TO RILLING &
NYESTIGATION
177.44

P.O. Box 64709, Burlington, Vermont 05406-4709

Tel: 802-658-0820

Fax: 802-860-1014

Project Name: Waterbury Dump

Project Name: Valerbury Dump
Project Location: Waterbury, Vermont
Boring Number: 5
Sheet 1 of 1
SDI Project Number: 99930

1970	@ 		\$4507751			1				
Boring Location: MW-3A and B Foreman: Chris Aldrich H&N Staff: Chris Aldrich and Steven LaRos			Date Started: 9/9/99 Osa Date Completed: 9/9/99		Rig Hours Meter Start: 668.4 Rig Hours Meter End: 674.0					
Sampling Method: Split Spoon Direct Pur Size: Hammer:					Groundwater Readings Date Depth Casing Stabil. Time					
Fall:_										
Sample			C	Sample Description	I	Strata Change & General Description	Field Testing PID		ent or Well talled	
No.	Recovery	Depth	Blows							
				Solenst sampling	l			MW-3B	Deep well	•
				7:50 AM - 12:15	PM 668.4 I	to 672.1			5' .020 scr sock. Nat	
				Augering						
				672.1 to 12:15 PM to				MW-3A	Shallow w	ell.
1	1.0	25-27	2,4,4,4	Medium gravel a	nd coarse	sand.	Saturated	Background	5' .020 sci sock. Har	nd slotted.
									Native fill	13' - 7'
				Set 1,5" diameter (3B). Shallow to		s deep to 30'			Bentonite	chips 7'-6'
	····								1	
						· · · · · · · · · · · · · · · · · · ·	:			
						-				
				·· <u>-</u>		 -		<u></u>		
									<u> </u>	
	<u> </u>				···-				1	
Propos	tions Used	Penatrat	ion Resista			/	Mail Commission	n Dataile	<u> </u>	
Trace:	0 to 10% 10 to 20%	140 ib. w Cohesiy	t falling 30"	on 2" O.D. Sample	r Cohesiv	'A	Well Constructio 2* PVC Screen (Sand:	
Some:	20 to 35% 5 to 50%	Density 0-4	≚ Very Loos	ie	Consiste 0-2		2" PVC Screen (.uzuj.	Concrete: 1	baq
		5-9 10-29	Loose Med. Den	se	3-4 5-8	Soft M/Stiff	Plug/Cap: 4 plug	ıs	Bentonite ch	- 1
		30-49 50+	Dense Very Dens	se	9-15 16-30 31+	Stiff Very Stiff	Filter Sock: 6'		Well Guard:	
<u></u>				<u> </u>	31+	Hard				

WOH=WEIGHT OF HAMMER

NA=NOT APPLICABLE

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Former Waterbury Town Dump Soil Quality Results Field GC (ug/kg)

Well	Depth	Compound	9/7-8/99
MW-1	13	PCE	ND / < 1
	ŀ	TCE	ND / < 1
	1	cis-1,2-DCE	2.9
	-	#UIPs	0
	20-22	PCE	4.1
	Į	TCE	1
		cis-1,2-DCE	ND / < 10
•		# UIPs	0
	25-27	PCE	2.6
	ļ	TCE	1.2
		cis-1,2-DCE	4.1
		# UIPs	0
MW-2	12	PCE	0.3
	1	TCE	ND / < 1
•		cis-1,2-DCE	0.8
		# UIPs	0
ļ	15-17	PCE	1.5
		TCE	0.9
}		cis-1,2-DCE	1.8
		# UIPs	0
MW-3	14	PCE	3.7
		TCE	1.3_
		cis-1,2-DCE	8.1
		j# UIPs	0



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/7/99 ANALYSIS DATE: 9/9/99 PROJECT NUMBER: 99109

SAMPLE LOCATION: TP-1 13' (MW-1)

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks

<u>Parameter</u>	<u>Detection Limit</u> (μg/Kg)		<u>Result</u> (μg/Kg)
мтве	20		ND ¹
cis-1,2,-Dichloroethene	10		2.9
Benzene	1		ND
Trichloroethene	1		ND
Toluene	1	:	ND
Tetrachloroethene	1		ND
Ethyl benzene	1		ND
Xylenes	2		ND
///			

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

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¹None detected

- Source Emissions Testing
- Source Permitting
- · Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/8/99 ANALYSIS DATE: 9/9/99 PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-1 20-22'

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks

<u>Parameter</u>	<u>Detection Limit</u> (μg/Kg)		<u>Result</u> (μg/Kg)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		ND
Benzene	1		ND
Trichloroethene	1	i i	1.0
Toluene	1	:	ND
Tetrachloroethene	1		4.1
Ethyl benzene	1		ND
Xylenes	2		ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

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¹None detected



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

- CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

— DATE SAMPLED: 9/8/99

ANALYSIS DATE: 9/9/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-1 25-27'

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks

	<u>Parameter</u>	$\frac{\text{Detection Limit}}{(\mu\text{g/Kg})}$		<u>Result</u> (μg/Kg)
		20		ND ¹
	MTBE	10		4.1
	cis-1,2,-Dichloroethene	1		ND
-	Benzene Trichloroethene	. 1	! !	1.2
	Toluene	_. 1		ND
	Tetrachloroethene	1		2.6
•	Ethyl benzene	1		ND
	Xylenes	2		ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/7/99

ANALYSIS DATE: 9/9/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: TP-2 12' (MW-2)

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks 3

Parameter	<u>Detection Limit</u> (μg/Kg)		<u>Result</u> (μg/Kg)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		0.8
Benzene	1	·	ND
Trichloroethene	1	-	ND
Toluene	, 1		ND
Tetrachloroethene	1		0.3
Ethyl benzene	1		ND
Xylenes	2		ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected

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- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/8/99 ANALYSIS DATE: 9/9/99 PROJECT NUMBER: 99109

SAMPLE LOCATION: MW-2 15-17'

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks

Parameter	<u>Detection Limit</u> (μg/Kg)		<u>Result</u> (μg/Kg)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		1.8
Benzene	1		ND
Trichloroethene	1	; ; ;	0.9
Toluene	1		ND
Tetrachioroethene	1		1.5
Ethyl benzene	1		ND
Xylenes	2		ND
-			

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

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¹None detected

- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury

PROJECT NAME: Waterbury Dump

DATE SAMPLED: 9/7/99

ANALYSIS DATE: 9/9/99

PROJECT NUMBER: 99109

SAMPLE LOCATION: TP-3 14'

SAMPLER: Steven LaRosa

ANALYZED BY: Kevin Brooks

<u>Parameter</u>	<u>Detection Limit</u> (μg/Kg)		<u>Result</u> (μg/Kg)
MTBE	20		ND ¹
cis-1,2,-Dichloroethene	10		8.1
Benzene	1	;	ND
Trichloroethene	1	İ	1.3
Toluene	1	i i	ND
Tetrachloroethene	1		3.7
Ethyl benzene	1		ND
Xylenes	2		ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

¹None detected

\\HN_\PROJECTS\WATER_DUMP\NEAQTFGC97.DOC

Former Waterbury Town Dump Discrete Interval Water Quality Results Field GC (ug/L)

Well	Depth (ft)	Compound	VGES	9/8/1999
MW-2B	18	PCE	5	7.6
14144-26	1	TCE	5	5.0
		cis-1,2-DCE	70	38.3
		#UIPs		11
	23	PCE	5	2.4
		TCE	5	4.0
		cis-1,2-DCE	70	56
	1	# UIPs		11
	25.5	PCE	5	5.4
: !	1 20.0	TCE.	5	5.2
	ļ	cis-1,2-DCE	70	58.6
	Į	# UIPs		1
Į	33	PCE	5	7.4
		TCE	5	7.9
1		cis-1,2-DCE	70	100.5
ļ	1	# UIPs		11
	48	PCE	5	7.3
		TCE	5	6,9
	Ì	cis-1,2-DCE	70	103.3
	4	# UIPs		1
1	51	PCE	5	7.1
}	"	TCE	5	7.0
	ł	cis-1,2-DCE	70	78.9
	ļ	#UiPs		1



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER:	99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION:	MW-2B 18'
그 보다 그 가는 사람들이 들어 가는 돈 힘들어 한 것 같아. 뭐 그는 가장이 있어?	SAMPLER:	S. LaRosa
DATE OATH LEED.	ANALYZED BY:	K. Brooks
ANALYSIS DATE: 9/9/99		

<u>Parameter</u> <u>Detection Limit</u> (μg/L)	Result (μg/L)
MTBE 20	ND ¹
Cis-1,2,-Dichloroethene	38.3
	ND
Benzene	5.0
Trichloroethene	ND
Toluene 1	7.6
Tetrachloroethene	ND
Ethyl benzene	ND
Xylenes 2	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NUMBER OF UNIDENTIFIED PEAKS FOUND: __1__

¹ None detected



- Source Emissions Testing
- Source Permitting
- · Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER: 99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION: MW-2B 23
DATE SAMPLED: 9/8/99	SAMPLER: S. LaRosa
ANALYSIS DATE: 9/9/99	ANALYZED BY: K. Brooks

Parameter	Detection Limit (μg/L)	Result (μg/L)
MTBE	20	ND ¹
Cis-1,2,-Dichloroethene	10	56
Benzene		ND
Trichloroethene	1	4.0
Toluene	4.7	ND
Tetrachloroethene	1	2.4
Ethyl benzene	1	ND
Xylenes	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUL	ND: 1

¹ None detected



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- · Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER:	99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION:	MW-2B 25.5'
DATE SAMPLED: 9/8/99	SAMPLER:	S. LaRosa
ANALYSIS DATE: 9/9/99	ANALYZED BY:	K. Brooks
) <u>etection Limit</u> (μg/L)	<u>Result</u> (μἰg/L)
MTBE	20	ND¹
Cis-1,2,-Dichloroethene	10 (1)	58.6
Benzene		ND
Trichloroethene		5.2
Toluene		ND
Tetrachloroethene		5.4
Ethyl benzene		ND (
Xylenes	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: ___1_

¹None detected



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER: _	99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION:	MW-2B 33'
DATE SAMPLED: 9/8/99	SAMPLER:	S. LaRosa
ANALYSIS DATE: 9/9/99	ANALYZED BY:	K. Brooks

Parameter Detection Limit (μg/L)	Result (μg/L)
MTBE 20	ND ¹
Cis-1,2,-Dichloroethene 10	100.5
Benzene 1	ND
Trichloroethene 1	7.9
Toluene 1	ND
Tetrachloroethene 1	7.4
Ethyl benzene 1	ND
Xylenes 2	ND

NUMBER	\triangle	UNIDENTIFIED	DEARC	COLÍNIDA	4
MOMBELL A	OF	OMIDEMILLIED	LEWV2	FOUND.	

¹ None detected



- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER:	99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION:	MW-2B 48'
DATE SAMPLED: 9/8/99	SAMPLER:	S. LaRosa
ANALYSIS DATE: 9/9/99	ANALYZED BY:	K. Brooks
<u>Parameter</u> <u>D</u>	etection Limit (μg/L)	Result (μg/L)
MTBE	20	ND ¹
Cis-1,2,-Dichloroethene	10	103.3
Benzene	1	ND
Trichloroethene	1	6.9
Toluene		ND
Tetrachloroethene		7.3
Ethyl benzene	1	ND
Xylenes	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: ___1_

¹ None detected

- Source Emissions Testing
- Source Permitting
- Ambient Air Sampling
- · Fugitive Emissions Measurement
- Indoor Air Sampling and Analysis
- Consulting/Engineering Services

CLIENT: Town of Waterbury	PROJECT NUMBER	99109
PROJECT NAME: Waterbury Dump	SAMPLE LOCATION:	MW-2B 51'
DATE SAMPLED: 9/8/99	SAMPLER:	S. LaRosa
ANALYSIS DATE: 9/9/99	ANALYZED BY:	K. Brooks

<u>Parameter</u>	<u>Dete</u>	ction Li (μg/L)	<u>mit</u>	Result (μg/L)
MTBE		20		ND ¹
Cis-1,2,-Dichloroethene		10		78.9
Benzene		1		ND
Trichloroethene		1		7.0
Toluene		1		ND
Tetrachloroethene		.1		7.1
Ethyl benzene		1		ND
Xylenes		2		ND

		· ·	
NUMBER OF	UNIDENTIFIED	PEAKS FOUND:	1 .

¹ None detected

Former Waterbury Town Dump Groundwater and Surface Water Elevations (ft)

\A/nii	Top of Pipe	9/21/1999
Well	101.86	89,38
MW-1A		89.48
MW-1B	101.98	89.35
MW-2A	101.52	
MW-2B	102.31	89.42
MW-3A	102.27	89.4
MW-3B	101.41	89.36
S-7S	89.84	88.94
S-7D	89.87	89.72
RPZ-1S	NA	underwater
RPZ-1D	NA	underwater
RPZ-2S	89.75	89.52
RPZ-2D	89.77	89.77
RPZ-3S	89.01	89
RPZ-3D	89.22	89.19
RPZ-4S	NA	underwater
RPZ-4D	NA	1.5' to water
River at S-7		88.89
River at RPZ-2		89.05
River at RPZ-3		88.88